

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF TRANSMITTAL
OF COPIES OF TRANSLATION
OF THE INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY
(CHAPTER I OR CHAPTER II
OF THE PATENT COOPERATION TREATY)
(PCT Rules 44bis.3(c) and 72.2)

To:

GEMEINSAMER PATENTSERVICE
Hausvogteiplatz 5-7
10117 Berlin
ALLEMAGNE

Date of mailing (day/month/year) 03 August 2006 (03.08.2006)	
Applicant's or agent's file reference HMI2003/1001	IMPORTANT NOTIFICATION
International application No. PCT/DE2004/002228	International filing date (day/month/year) 05 October 2004 (05.10.2004)
Applicant HAHN-MEITNER-INSTITUT BERLIN GMBH et al	

1. Transmittal of the translation to the applicant.



The International Bureau transmits herewith a copy of the English translation of the international preliminary report on patentability (Chapter I).



The International Bureau transmits herewith a copy of the English translation of the international preliminary report on patentability (Chapter II).

2. Transmittal of the copy of the translation to the designated or elected Offices.

The International Bureau notifies the applicant that copies of that translation have been transmitted to the following designated or elected Offices requiring such translation:

None

The following designated or elected Offices, having waived the requirement for such a transmittal at this time, will receive copies of that translation from the International Bureau only upon their request:

AE, AG, AL, AM, AP, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DK, DM, DZ, EA, EC, EE, EG, EP, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OA, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW

3. Reminder regarding translation into (one of) the official language(s) of the elected Office(s).

The applicant is reminded that, where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability (Chapter II).

It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned within the applicable time limit (Rule 74.1). See Volume II of the PCT Applicant's Guide for further details.

The International Bureau of WIPO
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1211 Geneva 20, Switzerland

Authorized officer

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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference HMI2003/1001	FOR FURTHER ACTION	See item 4 below
International application No. PCT/DE2004/002228	International filing date (<i>day/month/year</i>) 05 October 2004 (05.10.2004)	Priority date (<i>day/month/year</i>) 09 October 2003 (09.10.2003)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant HAHN-MEITNER-INSTITUT BERLIN GMBH		

1.	This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).																								
2.	This REPORT consists of a total of 12 sheets, including this cover sheet.																								
	In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.																								
3.	<p>This report contains indications relating to the following items:</p> <table style="width: 100%;"> <tr> <td style="width: 10%; text-align: center;"><input checked="" type="checkbox"/></td> <td style="width: 30%;">Box No. I</td> <td style="width: 60%;">Basis of the report</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table>	<input checked="" type="checkbox"/>	Box No. I	Basis of the report	<input checked="" type="checkbox"/>	Box No. II	Priority	<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input type="checkbox"/>	Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input type="checkbox"/>	Box No. VI	Certain documents cited	<input checked="" type="checkbox"/>	Box No. VII	Certain defects in the international application	<input checked="" type="checkbox"/>	Box No. VIII	Certain observations on the international application
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<input checked="" type="checkbox"/>	Box No. VIII	Certain observations on the international application																							
4.	The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).																								

<p style="text-align: center;">The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland</p> <p>Facsimile No. +41 22 338 82 70</p>	<p>Date of issuance of this report 27 July 2006 (27.07.2006)</p> <hr/> <p>Authorized officer</p> <p style="text-align: center; font-size: 1.2em;">Ellen Moyse</p> <p>e-mail: pt05@wipo.int</p>
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PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

Translation

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

Date of mailing (day/month/year) **See Form PCT/ISA/210 (sheet 2)**

Applicant's or agent's file reference

HMI2003/1001

FOR FURTHER ACTION

See paragraph 2 below

International application No.

PCT/DE2004/002228

International filing date (day/month/year)

05.10.2004

Priority date (day/month/year)

09.10.2003

International Patent Classification (IPC) or both national classification and IPC

H01L31/18, H01L31/0352, H01L31/07

Applicant

HAHN-MEITNER-INSTITUT BERLIN GMBH

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☒ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/EP

Authorized officer

Facsimile No.

Telephone No.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/DE2004/002228

Box No. I

Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language
_____, which is the language of a translation furnished for the purposes of international search (under Rule 12.3 and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

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Box No. II

Priority

1. ☒ The following document has not yet been furnished:

☒ copy of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(a)).

☐ translation of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date in the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43bis.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/DE2004/002228

Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

D2 (D2, figure 1 and associated text) discloses to a person skilled in the art a photovoltaic solar cell having an electrical solid-state contact between a semiconductor layer having a layer thickness d_{HL} and a multiplicity of metallic nanoemitters embedded in an electrically insulating oxide layer, which is arranged on the semiconductor layer, and each having a space charge zone of extent w in the semiconductor layer to which the minority charge carriers migrate over a diffusion length L , and also front and rear contacts.

A person skilled in the art knows from D2 (figure 7) that the efficiency of a solar cell is increased by virtue of the metallic nanoemitters being at a uniform distance $D=L$ (figure 7) from one another. A person skilled in the art likewise knows that an improvement is achieved by virtue of the penetration depth of the nanoemitters into the semiconductor layer being as large as possible (figures 8 and 9). In one example, $T=120$ micrometres, $L=200$ micrometres and $d_{HL} = 200$ micrometres.

A person skilled in the art would apply the teachings from D2 to the solar cell from D1 and in this way arrive at the subject matter of D1, without an inventive step.

Consequently, the subject matter of claim 1 does not involve an inventive step within the meaning of PCT Article 33(3).

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/DE2004/002228

Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

2.2 Dependent claims 2-4 do not contain any features which, in combination with the features of any claim to which they refer, meet the PCT requirements for inventive step. The reasons are as follows:

Dependent claims 2-4 concern only minor structural modifications of the solar cell from D1 or D2 of the kind that a person skilled in the art routinely makes on the basis of familiar considerations, especially since the resulting advantages are readily foreseeable. Consequently, the subject matter of claims 2-4 does not involve an inventive step either.

2.3 The subject matter of independent claim 5 does not involve an inventive step within the meaning of PCT Article 33(3). The same substantiation as in section 2.1 correspondingly applies to said claim. Although D2 does not indicate the method steps by which the nanoemitters are produced, the method steps disclosed in claim 5 are a conventional procedure for a person skilled in the art (see, for example, claim 1 of D3 and in particular [0063] - [0078]).

2.4 Dependent claims 6, 9 and 10 do not contain any features which, in combination with the features of any claim to which they refer, meet the PCT requirements for inventive step. Dependent claims 6, 9 and 10 concern minor structural modifications of the solar cell from D1, D2 or D3 of the kind that a person skilled in the art routinely makes on the basis of familiar considerations, especially since

WRITTEN OPINION OF THE
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Box No. V

Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement

the resulting advantages are readily foreseeable.

Consequently, the subject matter of claims 6, 9 and 10 does not involve an inventive step either.

- 2.5 The combination of features contained in dependent claim 7 is neither known from nor suggested by the available prior art.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

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Box No. VII

Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

- 3.0 Contrary to PCT Rule 5.1(a)(ii), the description does not cite documents D1-D3 or indicate the relevant prior art disclosed therein.

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/DE2004/002228

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

- 4.0 The application does not meet the requirements of PCT Article 6 because claims 1, 2 and 5 are not clear.
- 4.1 The expression "nanoemitters" in claims 1, 2 and 5 is vague and unclear and leaves the reader uncertain as to the meaning of the technical features in question. As a result, the subject matter of said claims is not clearly defined (PCT Article 6). The expression mentioned is not generally recognized in the technical field.
- 4.2 It would appear from figure 1 that the following feature is essential to the definition of the invention: the nanoemitters are electrically connected to the transparent conductive layer. Without this electrical connection, the solar cell does not appear to be able to function. Since independent claims 1 and 5 do not contain this feature, they do not meet the requirement of PCT Article 6 in conjunction with PCT Rule 6.3(b) that each independent claim must include all the technical features essential to the definition of the invention.
- 4.3 The relative expression "high electronic quality" in claim 5 does not have a generally recognized meaning and leaves the reader uncertain as to the meaning of the technical feature in question. As a result, the

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INTERNATIONAL SEARCHING AUTHORITY

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Box No. VIII

Certain observations on the international application

subject matter of said claim is not clearly defined
(PCT Article 6).